

Appln No. 10/656,086
Amdt date March 4, 2008
Reply to Office action of December 4, 2007

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Cancelled).
2. (Canceled).
3. (Canceled).
4. (Canceled).
5. (Canceled).
6. (Currently Amended) The electrolyte for a lithium battery according to claim [[1]] 9, wherein the organic peroxide or azo-based compound is present in an amount of 0.001 to 10 wt% based on the total amount of electrolyte.
7. (Currently Amended) The electrolyte for a lithium battery according to claim [[1]] 9, comprising an organic peroxide selected from the group consisting of isobutyl peroxide, lauroyl peroxide, benzoyl peroxide, m-toluoyl peroxide, t-butylperoxy-2-ethyl hexanoate, t-butyl peroxy bibarate, t-butyloxynodecanate, diisopropyl peroxy dicarbonate, diethoxy peroxy dicarbonate, bis-(4-t-butylcyclohexyl)peroxy dicarbonate, dimethoxy isopropyl peroxy dicarbonate, dicyclohexylperoxy dicarbonate, 3,3,5-trimethylhexanoyl peroxide, and dialkyl oxide.
8. (Currently Amended) The electrolyte for a lithium battery according to claim [[1]] 9, comprising 2,2'-azobisisobutyronitrile.

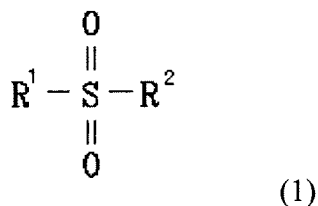
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9. (Currently Amended) An electrolyte for a lithium battery comprising a non-aqueous organic solvent, a lithium salt, and an additive comprising the polymerization reaction product of:

_____ a) a sulfone-based compound represented by Formula (1):



where R¹ and R² are independently selected from the group consisting of primary alkyl groups, secondary alkyl groups, tertiary alkyl groups, alkenyl groups, and aryl groups; [[and]]

_____ b) a C₃ to C₃₀ organic peroxide or azo-based compound; and

_____ c) ~~wherein the electrolyte includes~~ a poly(ester)(meth)acrylate or a polymer thereof wherein [[and]] the poly(ester)(meth)acrylate is a polymer derived from a (polyester)polyol with at least three hydroxyl (-OH) groups, where a portion or all of the hydroxyl groups are substituted with a (meth)acrylic ester and any remaining hydroxyl groups that are not substituted with the (meth)acrylic ester are substituted with a group having no radical reactivity.

10. (Currently Amended) The electrolyte for a lithium battery according to claim [[1]] 9, wherein the lithium salt is at least one selected from the group consisting of LiPF₆, LiBF₄, LiSbF₆, LiAsF₆, LiClO₄, LiCF₃SO₃, Li(CF₃SO₂)₂N, LiC₄F₉SO₃, LiSbF₆, LiAlO₄, LiAlCl₄, LiN(C_xF_{2x+1}SO₂)(C_yF_{2y+1}SO₂), wherein x and y are natural numbers, LiCl, and LiI.

11. (Original) The electrolyte for a lithium battery according to claim 10, wherein the lithium salt is present in a concentration ranging from 0.6 to 2.0 M,

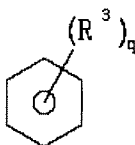
12. (Currently Amended) The electrolyte for a lithium battery according to claim [[1]] 9, wherein the non-aqueous organic solvent is at least one selected from the group consisting of carbonates, esters, ethers, and ketones.

13. (Original) The electrolyte for a lithium battery according to claim 12, wherein the non-aqueous organic solvent comprises at least one carbonate selected from the group consisting of dimethyl carbonate (DMC), diethyl carbonate (DEC), dipropyl carbonate (DPC), methylpropyl carbonate (MPC), ethylpropyl carbonate (EPC), methylethyl carbonate (MEC), ethylene carbonate (EC), propylene carbonate (PC), and butylene carbonate (BC).

14. (Withdrawn-Currently Amended) The electrolyte for a lithium battery according to claim [[1]] 9, wherein the electrolyte comprises a mixed solvent of a cyclic carbonate and a chain carbonate.

15. (Withdrawn-Currently Amended) The electrolyte for a lithium battery according to claim [[1]] 9, wherein the electrolyte comprises a mixed solvent of a carbonate solvent and an aromatic hydrocarbon solvent.

16. (Withdrawn) The electrolyte for a lithium battery according to claim 15, wherein the aromatic hydrocarbon solvent is a compound of Formula (6):



wherein R^3 is a halogen or a C_1 to C_{10} alkyl, and q is an integer of 1 to 6.

17. (Withdrawn) The electrolyte for a lithium battery according to claim 16, wherein the aromatic hydrocarbon solvent is at least one selected from the group consisting of benzene, chlorobenzene, nitrobenzene, fluorobenzene, toluene, trifluorotoluene, and xylene.

18. (Withdrawn) The electrolyte for a lithium battery according to claim 15, wherein the carbonate solvent and the aromatic hydrocarbon solvent are mixed in a volume ratio of 1:1 to 30:1.

19. (Withdrawn) The electrolyte for a lithium battery according to claim 15, wherein the electrolyte comprises a mixed solvent of an ethylene carbonate and a carbonate having a lower boiling point.

20-30. (Canceled).

31. (Currently Amended) A lithium battery comprising:

a positive electrode including a material that is capable of reversible intercalation/deintercalation of lithium ions, or a material that is capable of reversibly forming a lithium-containing compound as a positive active material;

a negative electrode including a lithium metal, a lithium-containing alloy, or a material that is capable of reversible intercalation/deintercalation of lithium ions; and

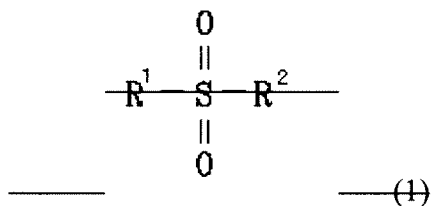
an electrolyte of claim [[1]] 9.

32. (Currently Amended) A lithium battery comprising:

a positive electrode comprising a lithium-nickel-based or a lithium-nickel-manganese-based oxide;

a negative electrode including a lithium metal, a lithium-containing alloy, or a material that is capable of reversible intercalation/deintercalation of lithium ions; and

an electrolyte comprising a non-aqueous organic solvent, a lithium salt, and an additive comprising the polymerization reaction product of: a) a sulfone-based compound ~~represented by~~ Formula (1):



~~where R¹ and R² are independently selected from the group consisting of primary alkyl groups, secondary alkyl groups, tertiary alkyl groups, alkenyl groups, and aryl groups; and~~

~~_____ b) a C₃ to C₃₀ organic peroxide or azo-based compound[.]; and~~

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c) a poly(ester)(meth)acrylate or a polymer thereof wherein the poly(ester)(meth)acrylate is a polymer derived from a (polyester)polyol with at least three hydroxyl (-OH) groups, where a portion or all of the hydroxyl groups are substituted with a (meth)acrylic ester and any remaining hydroxyl groups that are not substituted with the (meth)acrylic ester are substituted with a group having no radical reactivity.

33. (Currently Amended) The lithium battery according to claim [[31]] 32, wherein the negative electrode includes a carbonaceous material having a d002 interplanar distance of about 3.35 to about 3.38.

34. (Currently Amended) The lithium battery according to claim [[31]] 32, wherein the negative electrode includes a carbonaceous material having an Lc (crystallite size) measured by X-ray diffraction of more than 20nm.

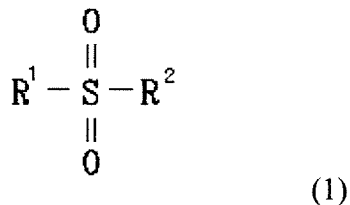
35. (New) An electrolyte for a lithium battery, comprising a non-aqueous organic solvent, a lithium salt, and an additive comprising the polymerization reaction product of:

a) a sulfone-based compound:

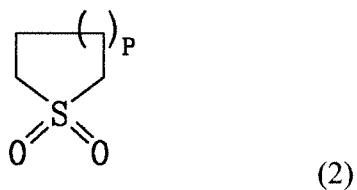
b) a C₃ to C₃₀ organic peroxide or azo-based compound; and

c) a poly(ester)(meth)acrylate or a polymer thereof, wherein the poly(ester)(meth)acrylate is a polymer derived from a (polyester)polyol with at least three hydroxyl (-OH) groups, where a portion or all of the hydroxyl groups are substituted with a (meth)acrylic ester and any remaining hydroxyl groups that are not substituted with the (meth)acrylic ester are substituted with a group having no radical reactivity.

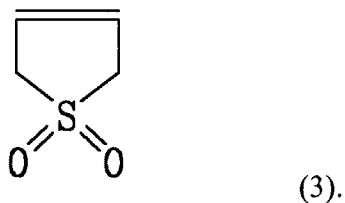
36. (New) The electrolyte for a lithium battery according to claim 35, wherein the sulfone-based compound is represented by one of the following Formulas (1) to (3):



where R¹ and R² are independently selected from the group consisting of primary alkyl groups, secondary alkyl groups, tertiary alkyl groups, alkenyl groups, and aryl groups;



where p is from 0 to 3; and



37. (New) The electrolyte for a lithium battery according to claim 36, wherein the sulfone-based compound is represented by Formula (1).

38. (New) The electrolyte for a lithium battery according to claim 35, wherein the organic peroxide or azo-based compound is present in an amount of 0.001 to 10 wt% to 10 wt% based on the total amount of electrolyte.

39. (New) The electrolyte for a lithium battery according to claim 35, comprising an organic peroxide selected from the group consisting of isobutyl peroxide, lauroyl peroxide, benzoyl peroxide, m-toluoyl peroxide, t-butylperoxy-2-ethyl hexanoate, t-butyl peroxy bibarate, t-butyloxyneodecanate, diisopropyl peroxy dicarbonate, diethoxy peroxy dicarbonate, bis-(4-t-butylcyclohexyl)peroxy dicarbonate, dimethoxy isopropyl peroxy dicarbonate, dicyclohexylperoxy dicarbonate, 3,3,5-trimethylhexanoyl peroxide, and dialkyl oxide.

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40. (New) The electrolyte for a lithium battery according to claim 35, comprising 2,2'-azobisisobutyronitrile.

41. (New) The electrolyte for a lithium battery according to claim 35, wherein the lithium salt is at least one selected from the group consisting of LiPF_6 , LiBF_4 , LiSbF_6 , LiAsF_6 , LiClO_4 , LiCF_3SO_3 , $\text{Li}(\text{CF}_3\text{SO}_2)_2\text{N}$, $\text{LiC}_4\text{F}_9\text{SO}_3$, LiSbF_6 , LiAlO_4 , LiAlCl_4 , $\text{LiN}(\text{C}_x\text{F}_{2x+1}\text{SO}_2)(\text{C}_y\text{F}_{2y+1}\text{SO}_2)$, wherein x and y are natural numbers, LiCl , and LiI .

42. (New) The electrolyte for a lithium battery according to claim 41, wherein the lithium salt is present in a concentration ranging from 0.6 to 2.0 M.

43. (New) The electrolyte for a lithium battery according to claim 35, wherein the non-aqueous organic solvent is at least one selected from the group consisting of carbonates, esters, ethers, and ketones.

44. (New) The electrolyte for a lithium battery according to claim 43, wherein the non-aqueous organic solvent comprises at least one carbonate selected from the group consisting of dimethyl carbonate (DMC), diethyl carbonate (DEC), dipropyl carbonate (DPC), methylpropyl carbonate (MPD), ethylpropyl carbonate (EPC), methylethyl carbonate (MEC), ethylene carbonate (EC), propylene carbonate (PC), and butylenes carbonate (BC).